

Notice of Allowability

Application No.

10/662,942

Applicant(s)

DAS ET AL.

Examiner

Art Unit

CHAMELI C. DAS

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/15/03.
2. ☒ The allowed claim(s) is/are 1-45.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 4/2/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 4/18/06
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

1. Claims 1-45 are allowed.
2. The drawings filed on 9/15/03 have been accepted by the Examiner.
3. The IDS filed on 4/2/04 has been considered by the Examiner.

EXAMINER'S AMENDMENT

4 An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ms. Marcia Tunheim, applicant's attorney on 4/18/06.

The application has been amended as follows:

In Claims:

Claim 1 (Currently Amended)

- at lines 11-12, replace [set of aliases] with value alias information

Claim 23 (Currently Amended)

A computer-readable storage medium having computer executable instructions, the instructions for performing a method of path-sensitive value flow analysis, the method comprising:

tracking a concrete state for each statement along each relevant path in an abstract program;

tracking value alias information for each statement along each relevant path in the abstract program, wherein the value alias information is determined by applying transform functions to determine value alias information based on a type of statement that is being processed in an the abstract program the value alias information comprising a first set of aliases that identify aliases for a designated value that is being analyzed and a second set of aliases that identify possible aliases for the designated value, a portion of the value alias information being obtained using imprecise memory alias analysis;

storing the concrete state and value alias information for each statement as one of a plurality of symbolic states; and

merging two symbolic states if two symbolic states exist for a specific location in the abstract program and if the value alias information in the two symbolic states are identical.

Claim 24 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 25 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 26 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 27 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 28 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 29 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 30 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 31 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 32 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 33 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 34 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 35 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 36 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 37 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 38 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 39 (Currently Amended)

- at line 1, replace [medium] with storage media

Claim 40 (Currently Amended)

- at lines 14-15, replace [set of aliases] with value alias information

REASON FOR ALLOWANCE

5. The following is an examiner's statement of reason for allowance:

The cited prior art taken alone or in combination fail to teach in combination with the other claimed limitations, a method for performing path-sensitive value flow analysis on an abstract program, the method comprising: storing the concrete state and value alias information for each statement along each relevant path in a symbolic store, the symbolic store storing a plurality of symbolic states, each symbolic state comprising the concrete state at a specific location along a specific relevant path in the abstract program and the value alias information at the specific location along the specific relevant path, the value alias information being associated with a designated value that is being analyzed; and merging two symbolic states in the symbolic store if the two symbolic states exist for the same specific location in the abstract program and if the value alias information in the two symbolic states are identical, as recited in the independent claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

8. The prior art made or record and not relied upon is considered pertinent to applicant's disclosure.

TITLE: Method of modifying a microinstruction with operands specified by an instruction held in an alias register, US 5222244 A

TITLE: Estimation of object lifetime using static analysis, US 6457023 B1

TITLE: Statically speculative memory accessing, US 6970985 B2

TITLE: System software for use in a graphics computer system having a shared system memory and supporting DM Pbuffers and other constructs aliased as DM buffers, US 6317134 B1

TITLE: Method and apparatus for detecting violations of type rules in a computer program, US 6986126 B2

TITLE: Method, system, and computer program product for performing register promotion via load and store placement optimization within an optimizing compiler, US 6128775 A.

TITLE: Alias address support, US 5119290 A.

TITLE: Methods for enhancing flow analysis, US 6813761 B1.

TITLE: Pointer analysis by type inference for programs with structured memory objects and potentially inconsistent memory object accesses, US 6202202 B1

TITLE: Whole program path profiling, US 6327699 B1

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TITLE: An incremental Flow- and Context-sensitive Pointer Aliasing Analysis, author:

Yur et al, ACM, 1999.

TITLE: Flow-Sensitive Type Qualifiers, author: Foster et al, ACM, 2002.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chameli Das whose telephone number is 571-272-3696.

The examiner can normally be reached on Monday-Friday from 7:00 A.M. to 3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Tuan Dam can be reached at 571-272-3695. The fax number for this group is (571) 273-8300.

An inquiry of general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is 571-272-2100.

Chameli C. Das
CHAMELI C. DAS
PRIMARY EXAMINER

4/18/06